

Background:

Military training and testing lands must be efficiently and cost-effectively monitored to assess conditions and trends in natural resources relevant to training sustainability, ecosystem maintenance, and the timing and success of restoration efforts. Ecological Indicator metrics represent important land management tools for tracking ecological changes and providing early-warning detection of threshold impacts related to training/testing missions.

Objective:

The objective of this research is to develop Ecological Indicator Guilds based on ecosystem relevant design criteria and multiscale performance and stress-response criteria, for the purpose of monitoring ecological changes directly relevant to biological viability, long-term productivity, and ecological sustainability of military training and testing lands. Three important capabilities of developed ecological indicators include: 1) the ability to assess and monitor multi-scale ecosystem stressor effects independent of natural environmental variability and disturbance regimes, 2) applicability to ecoregional contexts, and 3) approaches, analysis, and modeling capabilities could be extended to any global ecoregion.



Approach:

Classifications (GUILDS) of ecological indicators will be developed to assess and monitor ecological changes and thresholds relevant to land-use management decisions. These GUILDS will be developed from responses to ten indicator systems measured along ecosystem disturbance gradients. These indicator systems are: developmental instability, functional diversity of soil microbial activity, nutrient leakage, community integrity, ecological multiscale metrics, geoindicators, ecofunction groups, indicator taxa, and integration of all using Structured Equation Modeling and other multivariate methods.

Progress Table:

Following the first full year of field studies, these potential indicators have been evaluated for their utility across the disturbance gradients.

Potential Indicator	Disturbance		
	Low	Medium	High
Nutrient Loss	low	low	high
Soil Organics	high	high	low
Microbial Biomass	low er	higher	intermediate
Microbial Diversity	high	intermediate	low
Arthropod Diversity	high	intermediate	low
Ant Indicator Species Abundance	low	high	very high
Plant Stress	low	-----	high
Developmental Instability	low	intermediate	high

For more information, visit the SEMP website
<http://www.denix.osd.mil/SEMP>

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